**Honors Conceptual Physics Kinematics Practice**

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. In a graph of distance vs. time, what does the slope of the line equal?
   1. the slope of the floor
   2. distance traveled
   3. total time
   4. velocity
   5. acceleration
2. In a graph of velocity over time, what does the slope of the line equal?
   1. Velocity
   2. Distance
   3. Total time
   4. Acceleration
3. In order to find the distance travelled in a velocity over time graph, you must
   1. Find the slope of the line
   2. Divide the area into triangles and rectangles to find the area
   3. Add up the vertical axis numbers
   4. None of the above
4. The position time graph pictured below represents the motions of two objects, A and B. Which of the following statements concerning the objects’ motion is true? You may choose more than one answer. (3 points)
   1. Object B travels the greater distance
   2. Object A has the greater speed
   3. Object A leaves the reference point at the earlier time
   4. Both of the objects have travelled the same distance and time
   5. Object A is travelling for a longer period of time
5. For the objects shown in the graph, which is fastest?

distance

(m)

time (s)

0 1 2 3 4 5

5

4

3

2

1

0

B

C

A

LINE A

1. Say you want to ride your bike to Olney, Maryland. If Olney is 48 km from your house, and you can average 16 km/hr on your bike, what time do you have to leave to arrive at noon?

9:00 am or three hours before

1. What is the average velocity of a car that goes 120 m in 20 seconds?
   1. 120 m/s
   2. 0.17 m/s
   3. 2,400 m/s
   4. 21,400 m/s
   5. 6 m/s
2. What is the average velocity of someone who walks 3 km in a half hour, then 3 km in an hour, then 6 km in an hour and a half?

4 km/hr

1. If a bicyclist averages 10 m/s, how far will they go in 1 minute?

600 meters

1. The world record for the 100 m dash (running) is 9.78 s. The world record for 200 m is 19.32 s, and the world record for 400 m is 43.18 s. Which has the highest average speed, and what is it?

100 meter dash = 10.22 meters/second  
200 meter dash = 10.35 m/s  
400 meters = 9.26 m/s

11. A car accelerates at 2 m/s2 . Assuming the car starts from rest, how much time does it need to accelerate to a speed of 20 m/s? (2 points)

a. 2 seconds   
b. 10 seconds   
c. 20 seconds   
d. 40 seconds   
e. none of the above

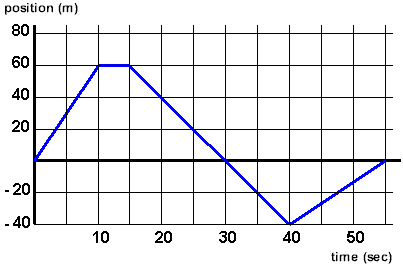
1. A ball is thrown upwards and caught when it comes back down. In the absence of air resistance, the speed of the ball when caught would be
   1. a. less than the speed it had when thrown upwards.
   2. more than the speed it had when thrown upwards.
   3. the same as the speed it had when thrown upwards. (2 points)

13. Suppose an object is in free fall. Each second the object falls (2 points)

a. the same distance as in the second before.   
b. a larger distance than in the second before.   
c. with the same instantaneous speed.   
d. with the same average speed.   
e. none of the above

14.

1. In the distance over time graph below, where is the object at 40 seconds?

 40 meters beyond home

1. What was the object’s average velocity from 15 to 40 seconds?

-4 m/s

1. What was the object’s velocity at 10 seconds?

zero

1. What is happening from 50 seconds to 55 seconds?

It is heading home (2.6 m/sec)

1. How far did the car travel altogether (not displacement!).

200 meters (60+100+40)

1. A car speeds up from rest to 50 m/second in 20 seconds. What is its acceleration?

2.5 m/s/s

1. .A baseball is thrown vertically with a speed of 20m/s. How long does it take the ball to reach maximum height? Ignore air currents and air resistance. (4 points) Show your work.

2.04 seconds 20/9.8 = 2.04

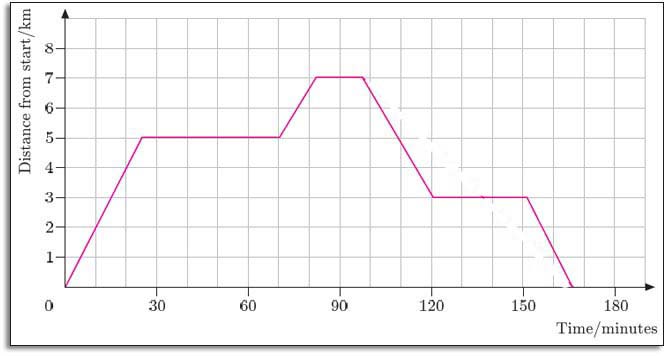
1. In problem 10 above, how far up does the ball travel? Show your work. (4 points)

x = ½ a t^2 = ½ 5 x 2.04 x 2.04 = 10.4 meters

1. How long would it take a car, starting from rest and accelerating uniformly in a straight line at 5 m/s2, to cover a distance of 200 m ? Show your work for full credit. (4 points)

x = v**i** t + ½ a t**2** 200 = ½ 5 t**2** t**2** = 80 t = 8.9 seconds

***Look at the graph below and answer the questions***

1. 

The graph shows

* 1. Acceleration over time
  2. Temperature over time
  3. Force over time
  4. Distance over time

1. At the end of 20 minutes, the graph shows that the object has gone \_\_\_\_ km.
   1. 2 km
   2. 3 km
   3. 4 km
   4. 5 km
2. What is happening to the object on the graph from 30 minutes to 70 minutes?
   1. It is speeding up
   2. It is standing still
   3. It is going backwards
   4. It is slowing down
3. At the end of 90 minutes, the object on the graph is
   1. 13 km from the starting point
   2. 5 km from the starting point
   3. 7 km from the starting point
   4. 9 km from the starting point
4. From 100 minutes to 120 minutes, the object on the graph

a is speeding up

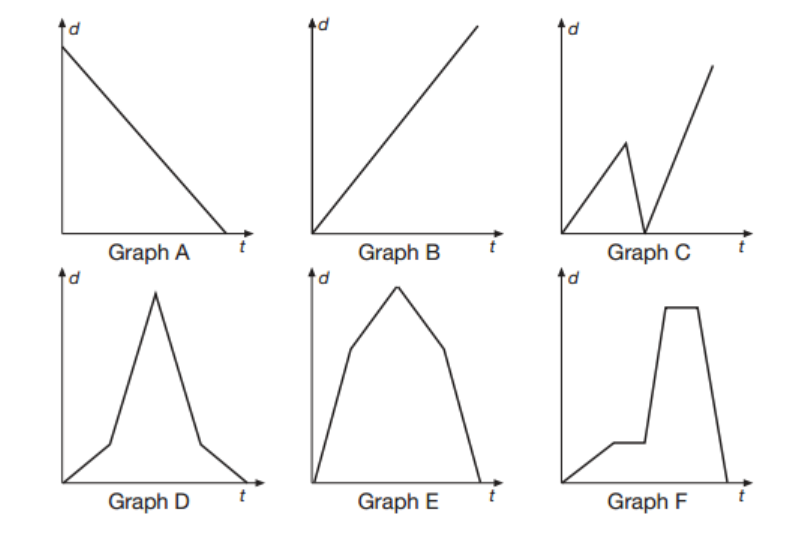
b It is standing still

c It is going backwards

d It is slowing down

**Graphing Distance Over Time**

**Match the following distance over time graphs to the stories listed below:**



1. Ivan headed off to school from home, but half-way there he

realized he had forgotten his lunch. He ran home, picked up his

lunch and then walked quickly to school. Graph C

1. Toby walked up the road from home then ran till he reached the

highway. He turned around and ran towards home, but walked

the last section. Graph D

1. John left his uncle’s place and rode his bike straight home. Graph A
2. Ali walked to the local café and had morning tea with a friend.

She then caught a taxi to the next suburb and went shopping.

Finally she caught a taxi that dropped her off outside her gate. Graph F

1. Amanda ran from her house to her grandmother’s place 2 km

way. Graph B

1. Aaron jogged away from home for 2 km, walked for the next

km, turned and headed home. Going home he walked for 1 km then jogged the rest of the way

Graph E